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by prof. Darvin Slavchev Ivanov, PhD

SUBJECT: competition for Professor in the field of higher education 4. Natural sciences, Mathematics and Informatics, professional region 4.2 Chemical Sciences, scientific specialty Chemistry, promulgated in the State Gazette No. 43 of 17.05.2024, for the needs of the Department of Physiology, Pathophysiology, Chemistry and Biochemistry at the Faculty of Medicine of the University "Prof. Dr. Asen Zlatarov" – Burgas.

Documents for the competition have been submitted by only one candidate – Assoc. Prof. Dr. Rumyana Zlatinova Yankova-Avramova from the Department of Physiology, Pathophysiology, Chemistry and Biochemistry at the Faculty of Medicine of the University "Prof. Dr. Asen Zlatarov" – Burgas.

Assoc. Prof. Yankova-Avramova graduated from the University "Prof. Dr. Asen Zlatarov" - Burgas, as chemical engineer, specialty "Inorganic and electrochemical productions". In 2015 she acquired the degree of PhD, and in 2016 she received the scientific title of Associate Professor in the scientific specialty Inorganic Chemistry.

Evaluation of the research activity of Assoc. Prof. Yankova-Avramova

The total number of scientific publications of the candidate is 119 (of which: 57 in Scopus and Web of Science; 61 publications are refereed and indexed in world literature sources and one monograph); Hirsch index, *h-index* = 14. The scientific publications for participation in the competition are 30, published in journals with impact factor (Web of Science) and impact rank (Scopus), (8 of them are in quartile Q1; 8 in quartile Q2 and 15 in quartile Q3). 150 citations were found on the works of the candidate for the competition.

Assoc. Prof. Yankova-Avramova has participated in one international scientific project, participation in one national scientific and one national educational project, participation in 13 inter-university projects at the Research Institute of the University "Prof. Dr. Asen Zlatarov" (she is the head of three of the projects), participation in 36 international

and national scientific conferences. She herself has participated in the organization of 9 scientific forums.

The candidate has refereed 52 scientific articles in prestigious international journals.

Her research work, as she herself points out, is related to the following areas:

- Synthesis and characterization of new ionic liquids.

A number of homogeneous catalysts have been obtained and characterized by spectroscopic and other modern methods. These ionic liquids have also been studied by quantum chemical methods of analysis, using the Density Functional Theory. It was found that the compounds possess a cyclic structure, due to the formation of intermolecular hydrogen bonds between the organic cation and the inorganic anion.

- Analysis of surface phenomena occurring in heterogeneous ionic liquids.

The phenomena interface surface of the ionic liquid - carrier have been studied. The nature of surface interactions in these heterogeneous systems as a function of the nature of the carrier is clarified. The spatial location of the immobilized active phase on the carrier surface in heterogeneous systems has been established.

- Study of the kinetics of thermal decomposition of ionic liquids.

For the first time, the thermal behavior of a number of ionic liquids has been studied. The mechanisms of melting and decomposition of samples, as a function of the degree of intermolecular hydrogen bonding and the nature of the carrier, have been established.

- Application of ionic liquids as effective catalysts for esterification.

The catalytic activity of synthesized ionic liquids has been studied in the processes of obtaining butyl acetate and methyloleate. On the basis of the presented mechanisms for the esterification process, mathematical models are derived, to study the kinetics and thermodynamics of obtaining the target products.

- Characterization of compounds for the purpose of their application.

A number of compounds have been synthesized and the structure-properties relationship at molecular level in some of them has been studied. The properties of some compounds have been predicted using modern computational methods, allowing the study of geometric and electronic structure, interactions and chemical bonds. The Density Functional Theory has been used, which has been proven for molecular modeling of compounds and for explaining their specific molecular properties.

- Synthesis and characterizing of coordination compounds and study of their reactivity.

The intra- and intermolecular interactions of a group of coordination compounds are investigated using Bader's theory and surface of Hirschfeld. The cytotoxicity of the

platinum(II) complex with 3-amino-1,2,4-triazole was evaluated. The results of this study show its high cytotoxic effect on cancer cells. The Pt(II) complex is a promising nanomaterial for various biomedical applications, including anti-cancer therapy. The antibacterial effect of the silver(I) complex with benzimidazole has been evaluated against Gram-negative E. coli ATCC25922 and Gram-positive Staphylococcus aureus ATCC 25923.

The presented scientific papers meet the quantitative criteria for occupying the position of "Professor", set out in the Regulations on the terms and conditions for acquiring scientific degrees and occupying academic positions at theUniversity "Prof. Dr. Asen Zlatarov" – Burgas.

Evaluation of the teaching activity of Assoc Prof. Yankova-Avramova

Assoc. Prof. Yankova-Avramova began teaching in 1990 and has 33 years of work experience. Her workload exceeds the accepted one of 400 hours. Her teaching activity consists in lecturing and conducting practical exercises in the discipline "Chemistry" for medical students studying in Bulgarian and English. She lectures and conducts exercises in other chemical disciplines for students from different specialties at the University "Prof. Dr. Asen Zlatarov" – Burgas. She is a co-author and author of 25 curricula and 8 teaching aids in various fields of chemistry.
Assoc. Prof. Yankova-Avramova has been a supervisor of two PhD students. Since 2015, she has been a supervisor of 8 graduates.

On the basis of the above, I give a high and positive assessment of the research and teaching activities of Assoc. Prof. Yankova-Avramova.

I know Assoc. Prof. Yankova-Avramova since when she was an assistant. We have worked together and I appreciate her as an excellent experimenter, she works precisely and shows depth in the scientific interpretation of the results. As a teacher she is distinguished by high qualities.

Conclusion

The research and teaching activities of Assoc. Prof. Rumyana Yankova-Avramova fully meets the qualitative and quantitative criteria for occupying the position of "Professor", set out in the Regulations on the terms and conditions for acquiring scientific degrees and occupying academic positions at the University "Prof. Dr. Asen Zlatarov" – Burgas.

I propose to the respectable jury to vote positively for the election of Assoc. Prof. Rumyana Zlatinova Yankova-Avramova on the academic position of "Professor" in the scientific specialty Chemistry, professional region 4.2. Chemical Sciences, field of higher education 4. Natural Sciences, Mathematics, Informatics for the needs of the Department of Physiology, Pathophysiology, Chemistry and Biochemistry at the Faculty of Medicine of the University "Prof. Dr. Asen Zlatarov" – Burgas.

19.08.2024

Sofia

Reviewer:

(Prof. Darvin Ivanov)